



NatureVolve

Bridging science & art

Issue 3

Featuring

**Searching for
tardigrades in
the Himalayas**

& more..

© Yashas Devasurmutt

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Explore..

Science Conservation Scicomm Art Health Written Word



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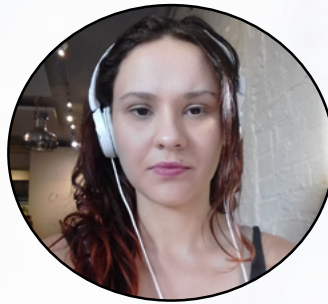
- Ceri Shipton
- Charlotte Hacker
- Clare Moody
(Naturalshift)
- Danielle Futselaar
- Debra Swack
- Eve Sanchez
- Hannah Yoder
- Johannes Gruenwald
(Gruenwald Laboratories &
Journal of Technological and
Space Plasmas)
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Editor's note



Thank you for downloading issue #3 of NatureVolve magazine, the first issue of 2019.

In this issue we have a range of subjects being discussed across Science, Conservation, Scicomm, Art, Health and Written word. Featured illustrators are showcased in both Scicomm and Art; and there are unique poetry pieces conveying scientific theories and philosophies, in the Written Word section.

Since 2018, we have been making some changes; sprucing up the magazine design, and introducing a new section, Health, that features topics in life science and wellbeing practices relevant to nature.

We also now have various [membership options](#) available. By becoming a Lifetime or Annual Member you can now support NatureVolve, and access perks such as rewards, competitions, community discussions and a members' only forum.

Best wishes,

Clarissa Wright

Editor-in-chief (EIC)



Bio

After completing MSc Applied & Petroleum Micropalaeontology from University of Birmingham and BSc Geology from University of Aberdeen, Clarissa Wright entered the academic publishing industry in London through various editorial and writing positions. Having pursued her own artwork in her spare time, and joining field expedition projects, she went on to lead editorial content for NatureVolve, from Scotland in the United Kingdom.

Above: EIC's latest artwork. This sketch is called 'Curiosity'. All rights reserved.



Contents

SCIENCE

- Searching for tardigrades in the Himalayas [6-9](#)
- Finding our early ancestors' stone tool innovations in East African cave [10-12](#)
- Founding a journal to make plasma physics more accessible [13-15](#)
- New formula to predict the mixing of fluids underground [16](#)

ART

- Finding the finest Thangka artworks with Gammas Art Gallery [47-49](#)
- Hannah Yoder [50](#)
- Lisa Sara Jenkin [51-52](#)
- Art illustrator showcase - Jean-François Podevin [53-54](#)

CONSERVATION

- Protecting the snow leopard [18-21](#)
- Conservation for everyone: Philippines as an example [22-24](#)
- Let's not forget the threat of land exploitation on the ecosystem [25-27](#)

HEALTH

- Connecting to nature through the Naturalshift programme [56-60](#)

SCICOMM

- Communicating 'the cloud' through creativity [29-32](#)
- Listening into microbial sounds for environmental awareness [33-37](#)
- Connecting to nature through television [38-41](#)
- Scicomm illustrator showcase - Danielle Futselaar [42-45](#)

WRITTEN WORD

- Zim Olson [62](#)
- Steven Duplij [63](#)
- Mohammad Ali Kheirollahi [64](#)
- Eve Sanchez [65](#)

EXTRAS

- Being featured and further information [66](#)

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Gammass Art Gallery

Collectors of luxury Tibetan Art, called Thangka - an ancient Tibetan style that is rich with tradition and symbolic meaning.

[Click here](#) to go straight to our interview with Gammass Art Gallery.



Above: 'Chenrezig - Newari style'. © Gammass Art Gallery. All rights reserved.

SCIENCE

The image features a dark blue background with a network of white nodes and lines, resembling a molecular or data network. The word "SCIENCE" is written in a light blue, serif font in the center. Below the word, there is a white, brushstroke-like graphic that looks like a stylized, abstract shape.

Searching for tardigrades in the Himalayas

Tardigrades are water-dwelling, segmented micro-animals that are also known as ‘water bears’. While they are near-microscopic, these organisms are sometimes described as ‘nearly indestructable’ because of their unique resilience to extreme environments, such as the bottom of the ocean and the edge of hydrothermal events. However, they are not only found in stressed conditions, as they occupy the majority of the globe.

In our interview with Yashas Devasurmutt, who researches tardigrades, we find out more about these tiny animals, and what makes them so successful. Yashas Devasurmutt recently visited the Himalayas to seek out the presence of tardigrades, with the assistance of a handy microscope, called ‘Foldscope’.



Above: 'Me and Foldscope at Khardung La.' © Yashas Devasurmutt

Q & A - Yashas Devasurmutt

How can tardigrades survive in such extreme settings as the vacuum of outer space, and around volcanic vents?

In response to extreme environment settings, tardigrades undergo a process known as Cryptobiosis – A state where metabolism is suspended. Depending on the environment they live in, they enter cryptobiosis via cryobiosis (a response due to low temperatures), anoxybiosis (response due to low oxygen), chemobiosis (response due to high toxin levels) or anhydrobiosis (response due to a desiccation environment). In all these conditions, they have a shrunken formation known as ‘tun’ state.

Previously, it was believed that Trehalose (a type of sugar synthesized for energy by some invertebrates) was the main reason as to how they could survive and later revert to their normal states. Only recently, researchers have discovered new proteins that aid them in survival. Two such proteins are Dsup (Damage Suppressor) - that suppresses X-ray-induced DNA damage by approximately 40% and improves tolerance to radiation and TDP (Tardigrade-specific intrinsically disordered protein) - that increases desiccation tolerance in tardigrades.

Please share some other examples of unusual and extreme settings that can tardigrades be found in. Why do they occupy these niche environments?

Tardigrades have been reported to exist almost throughout the globe. From the Himalayas (above 6,000 m (19,800 ft.)), to the deep sea (below 4,000 m (13,200 ft.)) and from the equator to Polar Regions. Recently, scientists drilling near

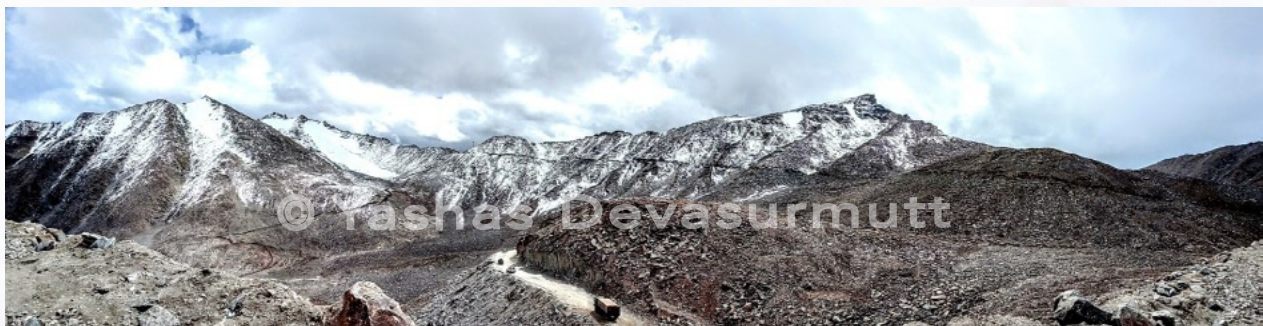
an underground lake by the South Pole found the remains of a dead tardigrade. It is still unclear as to how the tiny creature got there; if it really lived underground then it has tremendous implications. They’re the appropriate model organisms to study ‘panspermia hypothesis’ - a theory that life on planets originated from organisms or chemical agents brought by meteorites from outer space which further initiate life on planets. In addition, Antarctica mimics the polar regions of Mars.

It is actually a common misconception that tardigrades are extremophiles (organisms that thrive in extreme conditions); instead they just tolerate the extreme stresses, once if the environment seems normal enough they revert to normal state and thrive. Tardigrades are still enigmatic to most of the researchers.

From your research activities, are there any expeditions or field trip highlights you would like to share? Please tell us about how you used the paper microscope, FoldScope, while in the field.

Indeed, my latest venture was in the Himalayas in search of tardigrades as few of them are reported to be present in the region. We journeyed across the entire Trans Himalayan region that is inclusive of Ladakh and Lahul-Spiti valleys in search of them.

Foldscope aka origami paper microscope costs 1\$ to 1.5\$ and comes handy during field studies. It is portable and invulnerable to external damage. One has to just fold the paper according to the instructions and prepare the slides for visualizing. In order to find a tardigrade, one has to look for



Above: 'Khardung La'. © Yashas Devasurmutt

lichen or mosses around, collect them and soak them in mineral water or spring water. After soaking them for 2-3 hours, the samples are drained using strainer that comes with the Foldscope kit and few drops are mounted on the slides and visualized.

How many studies on tardigrades apply to different fields of science, such as the medical industry?

There are plenty of applications concerning tardigrades and their unique proteins. It is proposed that radiation tolerance in tardigrades is due to the both high capacities of DNA damage repair and DNA protection (Dsup). This special ability suggests life may exist in extraterrestrial environments such as the Martian surface where massive radiation exists.

TDPs can be very much useful in storing enzymes, vaccines and other protein therapeutics without

refrigeration or in dehydrated form, preservation of blood products, preservation of tissues and organs for transplant. These could be stored at room temperatures alone and can be shipped to various parts of the world.

In the future, can we expect to discover much more about these extreme survivors? What aspect of their study would you like to see investigated further?

Currently, the research on tardigrades is just a tip of an iceberg. Definitely, there are going to be more discoveries in the coming future.

I believe there are still a lot of genetic pathways and unique proteins to be discovered which makes the tardigrade so special. There is more to tardigrades than meets the eye.



Above: 'Tardigrade hunting'. © Yashas Devasurmutt



Left: 'Collecting lichen samples'.
© Yashas Devasurmutt

Final thoughts

It is a popular misconception that tardigrades are 'extremophiles' since they can be so resilient in certain extreme settings. Yashas Devasurmutt comments that contrary to popular belief, they are not extremophiles, but are very successful at occupying a variety of settings, and surviving in stressed situations. This could explain why tardigrades are so widespread the globe. In the future, investigating their genetic pathways may lead to new insight on these resilient animals.

Bio

Mr. Yashas Devasurmutt, Research Assistant, R&D Life Sciences at Dayananda Sagar Institution, Bangalore, India.

My current research work is about discovery and classification of Tardigrades (Water Bears) in the biodiversity hotspots on the Indian subcontinent. My other research interests are Nanotechnology and Artificial Intelligence.

Links

Profiles:

[Microcosmos Author Profile](#)

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Acknowledgements: "I would like to express my special thanks and gratitude to Department of Biotechnology, (Ministry of Science and Technology, Central Government of India) and Foldscope Inc. who gave this golden opportunity to explore and hunt for Tardigrades in Biodiversity hotspots in India.

Secondly, I would also like to thank my Project Investigator, Dr. Shinomol George, my colleague, Mr. Deepak Jayaraj, my parents, my family and friends who have assisted me in this journey." -Yashas Devasurmutt

Finding our early ancestors' stone tool innovations in East African cave

Between 50 and 80 thousand years ago, *Homo sapiens* had their most successful dispersal out of Africa, adapting to new challenges and environments. Around 67 thousand years ago, stone tools here showed a reduction in size, representing a shift in culture and hunting styles.

Ceri Shipton (Australian National University) investigated a trove of artefacts at a cave on the East African coast, called Panga ya Saidi, that dates back to 78 thousand years. Ceri Shipton shares possible explanations for what influenced the transition to smaller and sharper tools, at this important time in the archaeological record.



Above: Going under an arch in the second chamber at Panga ya Saidi. © Ceri Shipton.

Q & A - Ceri Shipton

Why is East Africa a great focal point for the study of the transition between the Middle and Later Stone Age?

What is the established evidence for this transition?

Genetic studies indicate our species dispersed out of Africa from East Africa, with the most successful dispersal from which all living non-Africans are descended taking place 50-80 thousand years ago.

However, the great majority of sites relating to this period are in southern Africa and those that are in East Africa are all in the interior and are not able to accurately date the transition from Middle to Later Stone Age.

This is the first site of this period on the coast of East Africa and the oldest in a tropical forest. We are able to constrain the age of the transition at the site and we can relate the archaeology directly to a multiproxy environmental record from the site.

Can you explain why the major shift at this time was probably not as simple as being due to dramatic migrations or technological revolutions, as previously thought?

The sequence at Panga ya Saidi is one of the most continuous anywhere in Africa with occupation in each of the last 5 Marine Isotope Stages, which represent the major global climate changes of the last 80,000 years. Previously, the Later Stone Age was thought to include a package of traits such as geometric shaped small stone tools, elongate stone blades, and ostrich eggshell beads.

What the continuous sequence from this site shows is that these traits do not form a coherent package, but come and go from the record over the last 67,000 years. What we see instead is that there was one seemingly mundane shift in stone tool size and material at the beginning of the sequence and then all the subsequent innovations happen within the context of this. There is no suggestion of a dispersing population from southern Africa, instead the innovations are locally driven.

Do you have an interpretation on why there was a reduction in lithic size and a shift to crystalline rock materials at around 67 thousand years ago?

My hunch is that it is to do with how the stone tools were being used, rather than the ways in which they were made. If you look ethnographically at what small sharp stone tools are used for they consistently have some interesting functions such as arrow tips, compound tools featuring multiple replaceable stone inserts, hair cutting, and even tattooing and scarification.

Hopefully, these possible functions can be tested by using replica stone tools and examining both replicas and archaeological tools under the microscope.



Above: The excavation under an overhang of the first chamber, just inside the main entrance to Panga ya Saidi. © Ceri Shipton

Now that you have published your recent article in *Nature Communications*, what will you be investigating next?

Now I have moved to the other side of the Indian Ocean and am investigating this phenomenon of deliberately creating small, sharp stone tools at sites on islands in eastern Indonesia and East Timor. Here, these miniaturized stone tools also characterize the record from the initial settlement of the area by *Homo sapiens* right up to the end of the Stone Age. I am looking at whether this is the same phenomenon that we see in East Africa and whether that's because it is an adaptation to similar coastal forest environments or even part of the same tradition.



Above: Close-up of the excavation under an overhang of the first chamber, just inside the main entrance to Panga ya Saidi. © Ceri Shipton

Final thoughts

We can look at stone tools in the archaeological record to find out how our earlier ancestors were adapting to new environments. Ceri Shipton highlights a key shift in stone tool innovation around 67 000 years ago, before more diverse innovations were to follow. It is suggested that the main reason for the shift in stone tool use was to help our early ancestors adapt to a new environment.

Ceri Shipton now continues to study miniaturized stone tools, though is currently focusing on sites in eastern Indonesia and East Timor. Perhaps some connections will be found between the miniaturized artefacts at these sites with those of the Panga ya Saidi cave in East Africa.


Bio

Ceri Shipton is the Fellow in Stone Artefact Analysis at the Australian National University. He has worked on Stone Age sites ranging in age from over a million years to the last few hundred years, in regions all around the Indian Ocean rim.

Links

Profile:
<http://researchers.anu.edu.au/researchers/shipton-c>

Founding a journal to make plasma physics more accessible

A black and white portrait of Johannes Gruenwald, a man with a beard and mustache, wearing a suit jacket and a bow tie. He is looking directly at the camera with a neutral expression.

Journal of Technological and Space Plasmas (JTSP) was launched by Johannes Gruenwald (Gruenwald Laboratories) to allow plasma physicists to publish open access articles on various topics in plasma research.

The motivation of JTSP was not only to offer physicists more affordable publication prices, but to include niche subjects in plasma physics, such as space plasmas technology, that are often considered out of scope for other journals.

In this feature, we speak with Johannes Gruenwald about the background behind JTSP and the importance of plasma physics.

Left: Portrait of Johannes Gruenwald.
© Johannes Gruenwald

Q & A - Johannes Gruenwald

Though many of us may have heard of plasma, space plasma is not well known. What is space plasma, and why is it important to research?

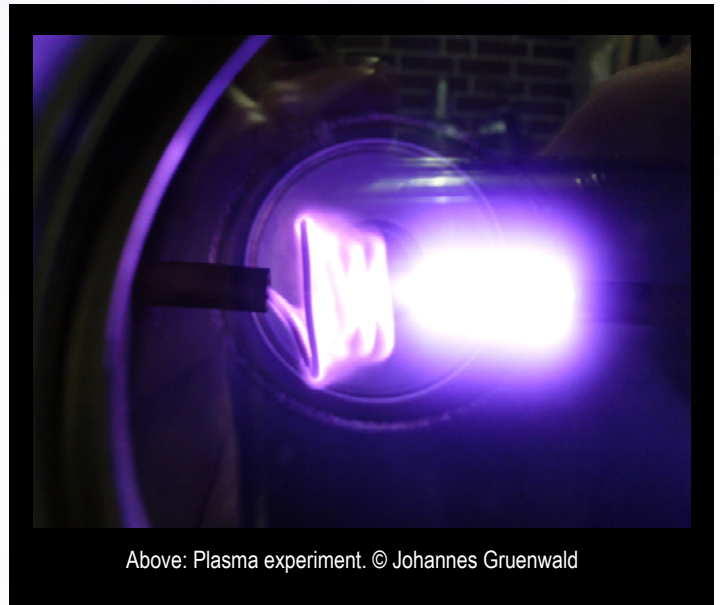
Plasma, as we physicists use the term, is usually a gas in which the electrons and ions are separated and can move freely around. This makes plasma electrically conductive and it strongly reacts to magnetic fields as well. Plasma can be found here on earth in form of lightning or the aurora borealis, for example, and in outer space where it makes up all the stars. Hence, the word 'space plasma' is not strictly speaking a scientific term, one can just use it to distinguish which plasma you are looking at. For this reason, I prefer to speak about the significance of plasma research in general, rather than just of plasma found in outer space.

Research of astronomical plasmas gives us understanding of how the universe works but there are also technological implications for manned and unmanned space missions. Here on earth scientists look into plasma that can be used for welding, for harvesting fusion energy and even for medical purposes. Especially the work on fusion research and plasma medicine (which is a very new field of plasma physics) will have some profound implications for our society in the future.

Please tell us about your background. How did you get into the field of plasma physics and technology?

I started my studies at the University of Graz in Austria, I inscribed for physics and a bit of chemistry and mathematics and I couldn't really decide in which field I wanted to work on. I was sure that I wanted to become a physicist and used mathematics and chemistry as useful complements but even in physics there were so many branches that basically all interested me.

One Semester I took up an optional seminar on plasma physics and I soon realized that this was really interesting. I saw that plasma physics is much more interdisciplinary than the other fields of physics I encountered up to then. If you are a laser



Above: Plasma experiment. © Johannes Gruenwald

“..scientists look into plasma that can be used for welding, for harvesting fusion energy and even for medical purposes”

physicist, for example, you need optics and some electromagnetism. When you do solid state physics you mostly need quantum mechanics but in plasma physics you really need everything: mechanics, optics, thermodynamics, electrodynamics, quantum physics, etc. I love this 'doing a little bit of everything', and so, I stuck with plasma physics ever since.

What inspired you to work towards the launch of The Journal of Technological and Space Plasmas (JTSP)?

There were two reasons, a practical one and an idealistic one. The practical one was that some years back I came up with the idea of using plasma splitting of carbon dioxide for a life support system for Mars or long term space missions. When I tried to submit the article to different space technology journals I got several quite positive feedbacks but everyone told me that my work would be out of scope of the journal. There was the same problem with the follow up paper and at some point I got the idea that there is not really a scientific journal that is devoted to plasma technology for space exploration.

Since space exploration and plasma technology will play a more and more important role in the coming

years, I broadened the scope of my journal and so JTSP was born.

The second reason was that I was not satisfied with most of the current open access journals as they charge quite some money, while I believe that science should be accessible to everyone, especially since most research is paid for by society anyways. Of course, you have to charge some money in order to get the journal going but since JTSP is only available online, we can charge much less for full open access. At the moment we have a special scheme for first time authors to our journal: 100 Euro for a letter up to four pages and 200 Euro for a full article. This includes everything from typesetting to full open access.

Please share the aim behind Gruenwald Laboratories. What is the connection between this organisation and JTSP?

Gruenwald Laboratories is the research company I founded last year. JTSP is fully owned by it, which shows the strong connection between creating knowledge and disseminating it in our company.

At Gruenwald Laboratories, how are the scientific and technical consulting services unique? Are they focused on helping inventors bring their ideas to market?

What is unique at Gruenwald Laboratories is the connection between fundamental research, which we also do, technological consulting, the dissemination of the knowledge we acquire through our journal JTSP and the fact that we also help inventors to bring their

ideas to market. This hybrid approach benefits our partners and customers as well as the scientists who decide to publish our work in JTSP.

Our customers profit from the fact that we can immediately apply our fundamental research results to our consulting activities. Our partners who we help to bring their ideas to fruition benefit not only from our expertise but also from our close connection to other industry partners.

Last but not least, the researchers who publish in JTSP will be promoted in the scientific arena and additionally within our industrial network, which helps again to bring scientists and industry close together.

Final thoughts

Open access allows readers to access scientific papers for free, and is becoming increasingly popular in academic publishing. When dealing with niche fields, despite their intrinsic importance, it can be challenging for scientists submitting their papers to meet the specific scopes of many established open access journals. JTSP is an open access journal that opens the door for niche subjects in plasma physics, while offering affordable costs for scientists, in an industry where publication costs are usually high.

Bio

Dr. Gruenwald has obtained his PhD in plasma physics in 2012 and has since worked in three different countries. He was active as a guest researcher in four more countries and has written or co-authored 42 scientific publications.

He was a speaker at several national and international scientific conferences. His research interests are theoretical and experimental plasma physics with a strong focus on plasma assisted surface modification and space technology.

Links

Gruenwald Laboratories: www.g-labs.eu

The Journal of Technological and Space Plasmas: www.jtsp.eu

[Researchgate Profile](#)

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New formula to predict the mixing of fluids underground..

..that can benefit Oil and Gas, and Environmental industries

A new mathematical model produced by [Chemotechnics \(UK\) Ltd](#) could benefit our understanding of how fluids mix together underground, whether in a petroleum reservoir, aquifer used for water supply, or certain soils.

This research was initially developed for reservoir engineering in the oil and gas industry, however it can be applied to further applications such as groundwater monitoring in the environmental industry.

The model has now been integrated into an online app, called Streamix Pro.

To assist with the app, there are free case examples available [online](#).

The team behind the app are now offering free use to new users.



Sign up

To get free use of this tool, you can fill in your email to a subscription box [here](#) (on the chemotechnics.com website). You will be contacted by the app team via email, who will set up an account for you to use for free.

You can read the [full story](#) behind this project, as featured on the NatureVolve [blog](#).

Conservation



Protecting the snow leopard

Snow leopards have uniquely adapted to high altitudes, spanning multiple countries in central Asia. Their evolution may be so tied to high altitude environments that their genes may have molecular changes that are associated with living in areas with low versus high oxygen.

This genetic correlation is one topic that conservation biologists, like Charlotte Hacker, investigates in the laboratory. Conservation biologists, like Charlotte, are assessing the approaches that can help to conserve the snow leopard populations that are under threat by multiple factors.

The main threat to snow leopards is from local human activity, often in retaliation to the attacks snow leopards make on nearby livestock. We discuss snow leopards in further depth, and the efforts taken for their conservation, with Charlotte Hacker.



Above: 'Sheep herd' - Smaller livestock such as goats and sheep can be an easy target for a snow leopard. When wild dietary options are unavailable, snow leopards will target domestic animals for food. (Photographer: Charlotte Hacker). © Charlotte Hacker.



Q & A - Charlotte Hacker

How has your personal career path led you to your current focus on snow leopard research and conservation?

I got hooked on conservation biology after living in Africa. It completely changed my world perspective. I did some wild elephant research, then moved into zoo elephant welfare. When I chose to pursue my doctorate I decided to take a risk and leap out of my comfort zone. I made a list of core research interests and approached PhD opportunities with an open mind. Simultaneously, I was conducting welfare assessments on a snow leopard at the zoo I was working at and started learning more about them. I was shocked how much remains unknown about their ecology, behavior, and population status. I quickly found that snow leopards and noninvasive genetics (using DNA from scat to assist in making conservation management decisions) fit my primary research interests.

I contacted my current advisor, who had a spot open in their lab, and started up that fall writing grants and doing preliminary analyses to work with collaborators in Asia to collect samples and build new projects. I was on a steep learning curve but everything came together for me during my first trip to China, and I haven't looked back since. It's been a crazy experience and I absolutely love what I do.

Many of us recognise the beauty of the snow leopard, though aren't aware of how they live in high-altitudes. How have they adapted to inhabit these settings?

It's incredible how natural selection and evolution have sculpted species to live in such extreme and unique environments.

Snow leopards have a vast range that spans 12 different countries in central Asia. While some live at relatively lower altitudes of 2,000m in Mongolia, other populations of snow leopards live as high as 5,500m on the Tibetan Plateau.

One of the research areas in our lab group is to identify the genomic differences that may be responsible for life at high altitudes by comparing candidate genes from snow leopard samples we've collected throughout their range across varying elevational gradients.

The candidate genes we are investigating are all part of the hypoxia pathway, and play roles in red blood cell production and lung ventilation. We suspect that while some of these genes may be fixed across the metapopulation, others may be variable based on elevation.



Above: 'Emanti' - A watercolor painting of a four-year-old tuskless elephant in South Africa. (Photographer: Charlotte Hacker). © Charlotte Hacker.



Above: 'Qinghai Highway Dulan' - The highest vantage point from a survey transect in snow leopard habitat in China. A recently constructed major highway can be seen in the background close by. (Photographer: Charlotte Hacker). © Charlotte Hacker.

**Why are snow leopards under threat?
Are specific human activities or environmental impacts the main causes?**

Numerous factors threaten snow leopard species survival but human activities play a large role. The livelihoods of most people living in snow leopard habitat relies on livestock. Large livestock numbers lead to overgrazing, reducing food sources and land for wild ungulates. This reduction in natural prey causes snow leopards to predate livestock for food. Animal loss causes large financial burdens on herders. This can lead to retaliatory killings of snow leopards to eliminate them and allow for financial recovery by passing the carcass into the illegal wildlife trade.

Part of my research is examining snow leopard diet and dependence on livestock to determine appropriate human-wildlife conflict mitigation actions to help reduce livestock loss. One current common technique to protect livestock is use of guardian dogs.

However, untrained dogs compete with snow leopards for food, can kill cubs, and may themselves be responsible for livestock loss. Conservation actions focused on saving snow leopards will have to center around 1) having accurate information about snow leopard population numbers, movement, and diet, and 2) using that knowledge to implement solutions that promote human-carnivore coexistence.

Please tell us about your art and how it supports your snow leopard conservation efforts?

My artwork started as an outlet to communicate to other people the passion I felt for the species I was studying and places I was spending my time in. Most of my pieces serve as snapshots of a specific moment – the textures of an elephant peeking through acacia trees, the lightness of a mountaintop over a sprawling ridgeline, the smooth silhouette of a big cat contrasted with watchful sharp eyes. Putting these moments on canvas and telling the stories behind them helps



Above: Portrait of Charlotte Hacker while out collecting snow leopard scat samples in Qinghai Province, China. Photo credit- Xie Ran. © Charlotte Hacker.

facilitate the emotional connections needed for people to care about the environment, and provides a mechanism to bring the outside, inside. My art pieces are heavily influenced by what I'm studying, so there are plenty of elephant pieces, but the last few years have been dominated by snow leopards and mountains.

I always come back from field work on the Tibetan Plateau inspired by the scenery, culture, and people I've met. As a conservation biologist, I get to work and live in places most people only dream of visiting. I'm very fortunate, and if I can capture that and inspire somebody to care about what's depicted in that picture, then I consider it a successful piece.

How would you suggest we can all take more action to promote the conservation of snow leopards?

A lot of my research has been funded by zoological institutions. I cannot stress enough how important it is to support your local zoo. Zoos have made incredible advancements in animal welfare, conservation education, and research. They are one of the last places humans get up close experiences with the natural world. Snow leopards are charismatic and recognizable, so they serve as flagship species and are common in animal collections. Most facilities that house snow leopards work towards providing information and funds that help us conserve them in the wild, and we in turn can provide information that helps them thrive in captivity. Also, snow leopard habitat is particularly vulnerable to the negative impacts of climate change, and policy changes are

“..snow leopard habitat is particularly vulnerable to the negative impacts of climate change, and policy changes are greatly needed..”

greatly needed. Individual grass root measures like saving energy, eating less meat, and taking public transportation can have positive impacts, but we also need to demand better from our governments.

Call your representatives, be persistent, vote, and encourage your friends to do the same. Climate change is a daunting challenge that at times can seem insurmountable, but proactive efforts from tenacious individuals can add up, move us in the right direction, and make a difference for at-risk species.

Final thoughts

Snow leopards are found in the mountain ranges of Central Asia, and are currently under threat. Researching this species, and applying appropriate conservation measures may help to alleviate their declining numbers in the future. Charlotte Hacker highlights that zoos can be valuable for conserving threatened species like snow leopards.

Bio

Charlotte Hacker is a conservation biologist using non-invasive genetic approaches to better understand the population status, phylogeography, diet, adaptation, and behavior of at-risk species.

Her work seeks to forge domestic and international collaborations with the goal of using scientific data to make informed and effective conservation management decisions.

Links

Website:

<https://charhacker.weebly.com/>

Twitter: [@chacker414](https://twitter.com/chacker414)

Conservation for everyone: Philippines as an example

By Jessica Tengvall (guest writer)

A fisher arrives in his bangka at the shore. Two men and a woman start walking out into the water to help the fisher bring the bangka (boat) in. The three people from land are all speaking loudly in the local language, Visayan. All four, helping each other lifts the bangka up, leaning it on their shoulders they carry it and places it on a bamboo-setup made for the boat. A few kids arrive and while talking they start taking fish and shells out of the net. People walk by and a few words are exchanged while their hands, working on autopilot, taking the fish out of the net. One man starts cutting a fish and squeezes kalamanzi on it. A woman brings out a pot of rice and everyone starts to eat the ceviche-like dish with bare hands. A short break was broken, only to continue fixing the fish, because the buyer has just started walking down the beach with a big scale under her arm...



Above: 'Getting fish out of a net'. © Jessica Tengvall.

Lives at stake

Described above is a normal occurrence in the Zamboanguita area in the region of South Negros, Philippines. People live on the beach with their bangkas outside their small houses with a constant eye on the ocean giving easy access to fishing with good conditions. Both women and men are involved in the fishing industry – all the way from fishing to selling it at the local markets. Most people quit school and start fishing when they are 10-12 years old. A man described the traditional fisher lifestyle to me like this;

“The ocean is our livelihood as fishermen. For us we don’t finish school, but we get livelihood from the sea. If we go work and try to get nice work, which we cannot because we are lacking education or didn’t finish school. We use it to have our children go to school. Until the water doesn’t go dry we will be there to use it as our farm or our livelihood.”

- Loloj, President of a fisherfolk association

The ocean is the main source of food and income. On a daily basis, people are fishing, taking everything that they can get - all species, all sizes. The fishing methods vary from passive net usage to active nets dragged through the water column. Whole communities depend on family members and friends to fish. No catch will most probably result in just rice with chili and vinegar for food for the day. Fish is an important source of protein, particularly

in poorer nations, because it is the cheapest and richest nutrient source. But, according to FAO (2018), 33% of fish stocks are subject to overfishing worldwide. Managing fishery issues while taking into consideration peoples’ current well-being is a difficult challenge.

Collaboration is the way

In the Philippines, I worked with the organisation Marine Conservation Philippines on investigating fisheries and marine protected areas (MPAs). I was inspired to see that many marine protected areas were established, and in fact, the locals managed the protected areas. Better yet, the local people were supportive and happy about the protected zones; a local woman expressed this to me;

“Before, a long time ago, when there was not a sanctuary or protected area in our place, corals, seagrass were destroyed because there’s so many nets dragging. The stones are broken and all the seagrass will be broken as well. Now there is the MPA, we are very very thankful.”

- Lili, secretary at a fisherfolk association.



Above: Bangkas outside a home in the Philippines. © Jessica Tengvall.



Above: Example of a catch. © Jessica Tengvall.

Sometimes restricting fisheries through protection zones can seem harsh when the survival of humans is at stake. However, Lili has seen the benefits that marine protected areas can have and appreciates the protective effect. The organisation and local governmental unit offer suggestions and help as much as possible with managing the protected areas, which kept people encouraged.

Through events held at the organisation for the local people, it has been possible to spread information on sustainable fishing for the benefit of both the people and nature alike. The events have not only enhanced the dispersion of information, but it has also boosted the opportunity for the organisation to engage in dialogue with the locals. To me, it appeared that a

respectful relationship of equality had been struck, where both stakeholders were listening to each other. From personal experience, I found that the more time I spent drinking coffee and being in their company built trust. Even through silence, we could establish more efficient conservation if we build trust.

It has become important to me that whatever conservation work I practice or implement, I need peoples' support because by encouraging people to take part, conservation efforts can be improved.

The difficulty of achieving sustainable fishing without diminishing fishermen's livelihood is not an easy task. However, a lot of work is being done around the world to achieve sustainable manner of fishing that will be beneficial for humans and ecosystems alike.



I am, especially after my time in the Philippines, of the belief that it is important that everyone; people, scientists, organisations, and governments need to collaborate to make the ocean once again a thriving place where the ocean can provide fish for future generations.

Left: Awareness event held by the organisation in a fishery village. © Jessica Tengvall.

Bio

Hi, I am Jessica Tengvall! I am a marine biologist specializing in fisheries. I recently did an internship with the organisation Marine Conservation Philippines, for six months in the Philippines. Currently, I am doing freelancing work such as producing podcasts for WWF Denmark on marine issues, writing articles and blogs on fisheries and ocean conservation, mainly.

Let's not forget the threat of land exploitation on the ecosystem

While climate change is important to address, there are also other types of environmental threats that require public attention, like habitat loss due to infrastructure developments and urbanisation. How we use land has impacts on local habitats and wildlife that can be observed in the short-term.

Joshua Reece is an assistant professor of Biology at California State University, who comments that the effects of land exploitation can be seen sooner than climate change. This raises the question of whether we should be paying more attention to habitat exploitation as a key conservation issue at present. Joshua Reece explains more.



Q & A - Joshua Reece

Please tell us about your current research focus and what brought you to this field?

I am a generalist in ecology and evolution. Broadly speaking, my research focuses on understanding how diversity is distributed, what processes led to those patterns, and how conservation and management can preserve that biodiversity. Much of my work right now focuses on identifying the threats that species and natural communities face at the intersection of human modification of the landscape, climate change, and sea-level rise.

I came to this field because hitherto, my work had focused on subtle nuances of figuring out how different species were related to one another using genetics, and what we could model about patterns and processes of evolution leading to the traits that species display. I found this work interesting, but it was difficult to communicate its importance to the public.

However, identifying threats and coming up with guidelines to keep our ecosystems healthy and functioning is something that I can easily communicate to the public. Virtually all scientific research is worthwhile, but it is nice to work on things that people care about.

During your Gulf Coast Vulnerability Assessment (GCVA), as described in your recent publication in PLOS ONE, which natural communities and species were you focusing on, and why?

We went through a long process of consulting folks in the agencies that manage ecosystems, stakeholders in industry and government at the local level, and researchers such as myself to determine which species and ecosystem would be good to assess. In the end, we identified 11 species and 4 ecosystems that were somewhere on the spectrum of being ecologically and economically important, but that were also representative of the coastal region and impacted by sea-level rise. Many of these representatives are

what we call umbrella species, which are species for which it is true that when you protect them, you protect the many other species that either co-occur or depend on them.

From your research, had you found that land-use or climate change were more impactful on the coastal environment? What were the key contributing factors?

We found that patterns of land-use and landscape modification were both historically more impactful AND likely to be more of a threat in the future than were climate change and associated sea-level rise. Although this message is largely lost in how we communicate with the public, species and natural communities face far greater threats from overexploitation, bulldozers, tractors, roads, invasive species, pollution, and urbanization than they do from climate change, at least for the next 50-100 years.

Why do you think that overexploitation, habitat loss and habitat degradation are not addressed enough, when compared to climate change?

While controversial, climate change is a sexy topic. It is big and global, and the potential ramifications are enormous. Try to visualize a past that was not too long ago, geologically speaking, with icebergs up to a mile high grinding across the northern half of North America, leveling mountains and swiping landscapes to the granite bedrock.

Imagine sea-levels rising to engulf virtually all of Florida, leaving only a tiny, narrow peninsula that extended maybe 2/3rd of Florida's current length into the Atlantic. That is what climate change can do. We can't visualize the pace of that change, which was slow by our standards, but we can visualize the extremes and they are dramatic.

We do, however, see land-use change in real time. You have probably all seen large swaths of forest turned into shopping centers and parking lots. It took time for that kind change to happen and it happened incrementally to our way of thinking, but in reality, it was extraordinarily fast; bewilderingly fast on ecological timescales. It will take more than

100 years before climate change dramatically alters the landscape of the planet, and it almost certainly will, but for the next 50-100 years, the ravages of traditional threats are just more of an issue.

Perhaps it makes sense to focus our message on anthropogenic climate change, because ultimately it will cause large-scale changes to the planet, but my position is that for the timescales that matter for sociopolitical and regulatory change, we should be focusing on mitigating the plain old threats we have put to nature for hundreds of years- overharvesting, rapid road-building, and industrial agriculture, to name just a few.

What do you believe are the tangible threats to our ecosystem, and how can environmentalists address these?

Rather than just what I believe, I will say that the evidence is clear: the major threats that ecosystems and species face today are overexploitation, industrial agriculture, urban expansion, invasive species, pollution, habitat degradation, and yes, climate change. But what my work and that of many others is showing is that for the next 50 to 100 years, climate

“..climate change dramatically alters the landscape of the planet.. but for the next 50-100 years, the ravages of traditional threats are just more of an issue”

change is not the biggest threat, the other threats in that list are. We should spend as much time as conservationists and environmentalists focusing on mitigating those threats as we do lobbying the public to drive more fuel efficient vehicles and purchase carbon offsets for their air travel.

Moreover, if we do alleviate those other threats, we are not ignoring impending climate change, we are increasing the nascent adaptive capacity of species and ecosystems to deal with climate change in the future, which frankly, most of them could handle were it not for all of the other threats we have placed on them.

Final thoughts

Agriculture and urban exploitation are a few examples of ways in which ecosystems are under threat.

Joshua Reece emphasises that these are key present-day issues, in addition to climate change. This provokes questions on the actions that we can take in the present day, to preserve our ecosystems that are under threat by land use, while also remaining aware of climate change.

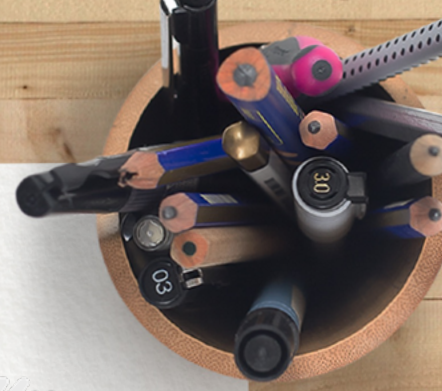
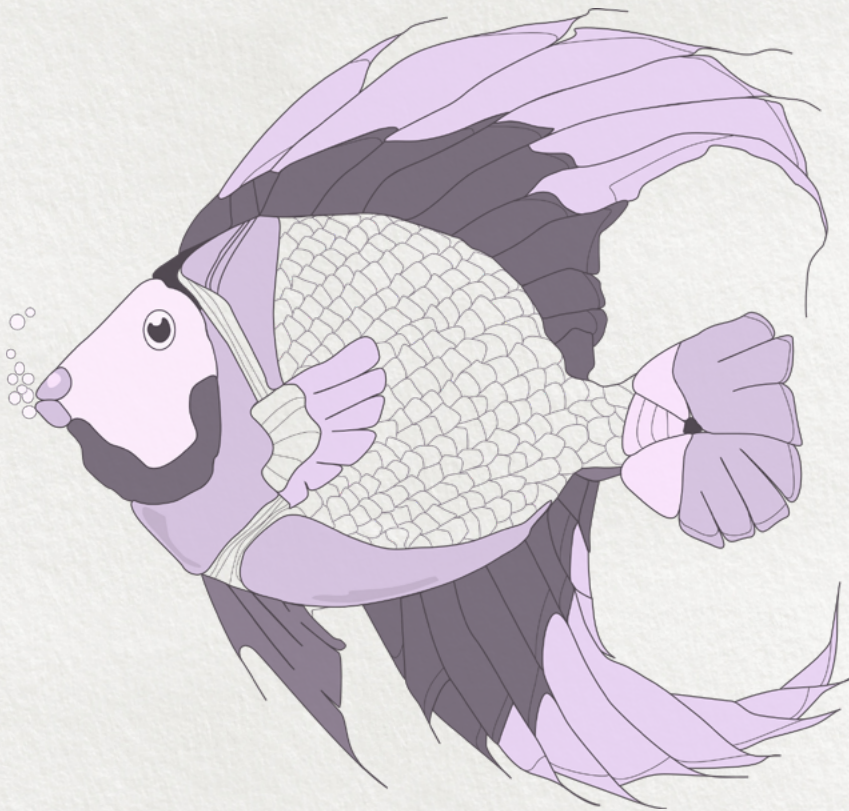
Bio

Joshua Reece is an assistant professor of Biology at California State University at Fresno. He researches population genetics, phylogenetics, and conservation biology with a focus on the impacts of climate change and sea-level rise to coastal ecosystems. He earned his undergraduate and MS degrees at the University of Central Florida, and a PhD from Washington University in St. Louis.

Links

Profile:
<http://www.fresnostate.edu/csm/biology/fac-staff/faculty/joshua-reece.html>

Scicomm (Science communication)



Communicating 'the cloud' through creativity

Coming from a background in computer science, Debra Swack conveys abstract concepts through creative work. While many of us are not familiar with computer science, or coding, many of us have heard of 'the cloud'. This term has multiple meanings. In computer science, it is used as a metaphor for the internet, while in the arts, its meaning may be more widely adapted. The concepts of 'the cloud' are portrayed in the Cloud Mapping Project - one of the creative projects that Debra Swack discusses with us further.



Above: 'Bloom Simulated growth patterns through bio-acoustic stimulation 2015'.
© Debra Swack. All rights reserved.

Q & A - Debra Swack

What brought you into the creative arts after having pursued software development?

I have always been interested in science, but began my career in art. Many of my family members are musicians or engineers, so I was exposed equally to both disciplines. My father composed classical music, performed by members of the New York Philharmonic, while his brother was a thermodynamic engineer for NASA. He studied with Henry Cowell (John Cage's mentor), at Columbia, and exposed me to experimental forms of music, along with historical inventions, such as the phonograph, by Thomas Edison. So this idea of innovation was always in the back of my head, whether it was in art or science. After getting an art degree, I realized I needed a day job, and didn't want to work in commercial art (graphic design).

I always loved science fiction, psychology, and scientific innovations, and decided to try my hand at computer science. At that time there were not many women in computer science, and there was also a resistance to digital art and digital photography. Mostly universities and progressive companies like Xerox Parc, where I exhibited frequently in the early 90s, were the only ones to offer opportunities to artists working with science and technology.

Xerox was amazing, and they included me in their 25th anniversary exhibit, and MIT publication, Art and Innovation at Xerox Parc (1999). Since then it has worked out very well, as my art projects are really the stuff of science fiction, and through collaboration I get to use cutting edge tools to make them!

How do you integrate technical and scientific concepts into your creative arts projects?

Since my background is in both (computer) science and the arts, I approach each project by thinking about how I can both express technology, and use it to fabricate the work. I combine arts, with science and technology, and other disciplines, including cultural ideals that can unknowingly influence scientific research (although that is changing). I like to reference historical concepts, beliefs, and techniques, to study how, if, and why, contemporary tools, and theories, have changed practices, and what

that means now, and for the future. Some projects that utilize these concepts include 95 Chimes, a 95-channel sound installation, which relates music to string theory, (sound invokes form and form invokes sound), that I adapted for 16 speakers, at the Staller Center (Stony Brooke University) in 2016.

Inspired by Brian Greene's The Elegant Universe, it was first presented at the ASCI SCI-Art Symposium in 2002, at the Museum of Natural History, in New York.

Bloom addresses plant consciousness, and includes the discovery that plants grow towards 220hz sound, which can act like a virtual fertilizer to aid world hunger, The Emotions after Charles Darwin addresses autism and emotion research, the universality of emotions on a neurobiological level, regardless of age, race or gender, and the dangers of genetic modification, Cloud Mapping Project addresses surveillance, artificial intelligence, machine learning, and creativity (can machines create?), and Animal Patterning Project addresses the history of genetically manipulating animals, their environmental and indigenous displacement through urbanization, and how we can co-exist with them in urban spaces.

“The cloud has many meanings and definitions, whether you are talking about its origins in art, meteorology, or computer science..”

Many of us have heard of ‘the cloud’, though aren’t aware of its definition.

How would you explain ‘the cloud’?

Is this an inspiration for the Cloud Mapping Project?

The cloud has many meanings and definitions, whether you are talking about its origins in art, meteorology, or computer science (cloud computing), including its applications in surveillance, and data mining. In 2014, I presented Cloud Mapping Project at the Pera Museum for Leonardo (MIT Press), which synthesizes all those meanings into one project. 200 years ago, we couldn't view the earth from outer space, and nanotechnology didn't exist. Because we now have more sophisticated

microscopic and macroscopic views of the world, this creates new perspectives that we didn't have before, which will be on-going with new advances in technology and biology.

Those understandings also affect advances in art. Cloud Mapping Project is a 21st century project that uses remote sensing devices used in scientific applications such as meteorology, and governmental surveillance, to generate artistic images. This is in direct contrast to artists and scientists from the past whose works were created by their own hand, through personal observation.

The notion of privacy is becoming an archaic ideal that we have traded in for the instant gratification that our digital devices provide.

Is that important? That depends. We don't want to wind up being controlled by our devices, or have our personal information compromised, or mined by predatory individuals, due to breaches in security. It's also important occasionally to put down our devices and be in the world. We don't want to lose our abilities

to be uniquely human, which is something intelligent machines have not mastered, at least not yet.

What will you be working on next?

I am currently working on The Monument Project, a public art project, with global partners, about the democratization of memorialization, heroes, and economic self-empowerment. It is also a continuation of my research in virtual reality environments, started in 2008 at Banff Centre, where I created Digital Maze Symmetry Project, in a CAVE environment, but this time I'm using HoloLens mixed reality headsets.

The Monument Project was just short listed by Creative Time, an arts organization in NYC, and I plan to do a mixed reality installation in Central Park, where visitors can don Microsoft Headsets. The Monument Project uses the artistic tools of the past, to generate mixed reality, 3D holographic portraits, using the Microsoft HoloLens headset. It includes the marginalization of women and minorities in public monuments, and uses technology to raise awareness of their achievements and



Above: 'Animal Patterning' - Project performative dance 2015 commissioned by the West Harlem Art Fund and Pratt Institute. © Debra Swack. All rights reserved.

contributions to society. Provocative monuments from the past need to be re-contextualized, and possibly removed from the public sphere, if they perpetuate hate, dominance and exclusion.

I am trying to create a more dynamic (living) model for civic dialogue, in public spaces based on inclusiveness, enhanced by the use of technology, which also allows the conversation to continue offsite. The Monument Project, was called ‘an important

work’ by Margaret Morton of the Ford Foundation, and is a 2018 recipient of a Creative Engagement grant from the New York City Department of Cultural Affairs, and the Lower Manhattan Cultural Council, in collaboration with the Rubin Foundation, Siddhartha School, Banff Centre, and Microsoft.

Final thoughts

Debra Swack discussed how in the 90s there were few opportunities for artists to work with science and technology. Even so, Debra Swack was persistent with creative projects, while pursuing computer science. In the twenty-first-century we can see the results of The Cloud Mapping Project; presenting artistic images that were generated using the same remote sensing devices used in scientific applications; such as meteorology and governmental surveillance. This creative method contrasts with traditional artwork of the past that was made through personal observation rather than scientific technologies. Next, Debra Swack has exciting art projects and developments in view, from New York City.

Bios

Debra Swack is a digital artist with degrees in art and computer science, who likes to create transformative participatory experiences, about the most important issues of our time.

Her writings have been published by MIT Press, and she is currently working on The Monument Project, using the Microsoft HoloLens, that was shortlisted by Creative Time for an installation in Central Park.

Links

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<https://test.leoalmanac.org/wp-content/uploads/2013/09/LEAVol19No4-Swack.pdf>

<https://contemporaryarts.mit.edu/pub/cloudmappingproject>

<https://www.nyas.org/magazines/imagining-the-next-100-years/imagining-the-next-100-years-of-science-and-technology/>

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Listening into microbial sounds for environmental awareness

Ruth Schmidt and Sandry Volny listen into microbial sounds, and through their creative work, offer us a new perspective on our environment, since microbial communication is invisible to us day to day. They joined forces to combine science and art in the Aural Soilsapes Project to bring about our attention to our connection with the natural environment, and to increase awareness about climate change. Ruth Schmidt and Sandra Volny teamed up to talk to us.



Above: Sonja Bäümel, Fifty percent human (Amsterdam), 2016. Courtesy the artist.
Photo - Jean-Sonja Bäümel. © Ruth Schmidt. All rights reserved.

Q & A - Ruth Schmidt & Sandra Volny

[Ruth Schmidt]

How can microbial ecology support climate change research and awareness?

Microbial Ecology is the study of the interactions of microorganisms with each other and their environment. As such, I look at how microbes communicate with each other through smells, or volatiles. A common example I like to give is the sweet, fresh and evocative smell following the first rainfall after a dry spell. This earthy-smelling substance is geosmin, a chemical released into the air by a soil-dwelling bacteria called actinomycetes. Microbes — thanks to the scents they release — can help plants better tolerate these stressful conditions, an important service in a warming climate. My research focuses on understanding how microbes and plants work together, and which microbial scents help crops.

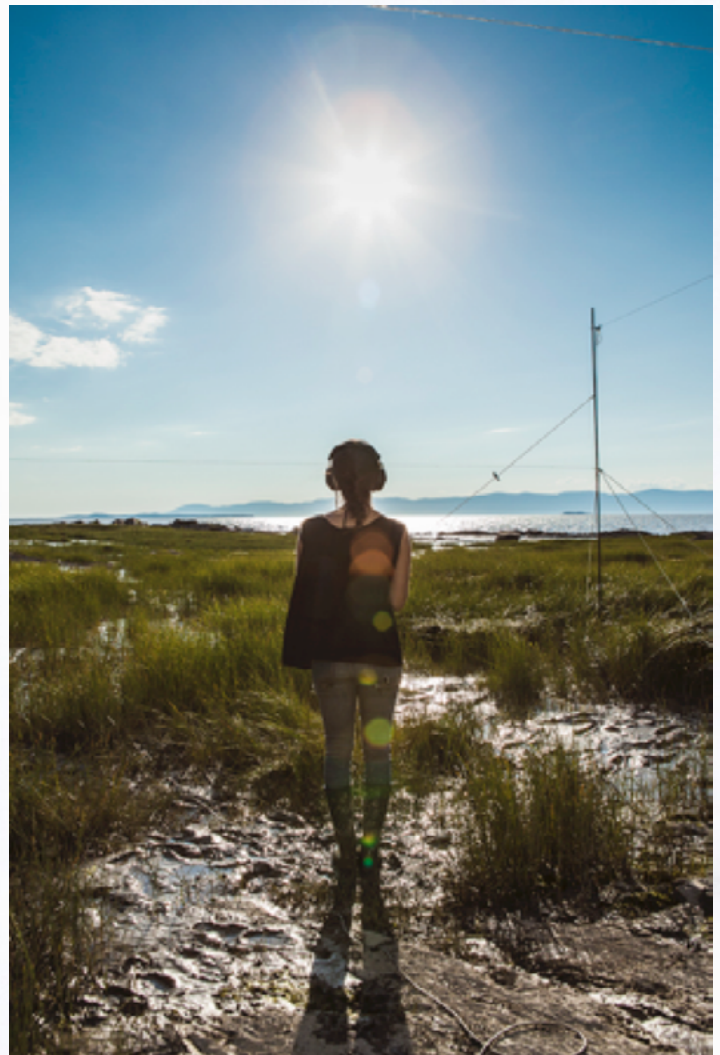
Like our human body, the plant relies on its microbes to maintain their health, growth and protection from environmental stresses. This tight interaction is also called a holobiont, which can be considered a “superorganism” — an organized society that functions as a whole. By understanding the mechanisms underlying this tight interaction, we can then select the microbes that carry the genes for the smells that help plants withstand drought — and feed them to our crops like vitamins so that they can continue to provide us with food in a warmer future.

Please tell us how you merge your microbial studies with collaborative artists, to make ‘microbial music’, and exhibitions?

I started to collaborate with artists a few years ago during a workshop aimed to promote cross-disciplinary approaches by bringing together artists and scientists. It was here where I met Lucas Wiegerink, a composer, and Eva van Ooij, a cello player, with whom we composed a musical piece inspired by microbial communication. We used a scientific article as basis to understand how microbes communicate with each other through electrical signals. This idea was then translated into a musical piece in which the playing instruments symbolize the several sound signals that microbes use to communicate. Another example stems from an

exhibition called 50 percent human by Sonja Bäuml, a bio-artist based in Amsterdam. The project evolved around the central question “How much human are we, if at least half of our body consists of microbial cells?”

“The project evolved around the central question ‘How much human are we, if at least half of our body consists of microbial cells?’”



Above: Sandra Volny, Radio Jove, (sound installation), 2015. Courtesy the artist. Photo: Jean-Sébastien Veilleux. © Sandra Volny. All rights reserved.

During the creative process, a multidisciplinary team of artists, scientists, and science historians examined, questioned, and challenged the relationship between the human body and its microbial cohabitants. In particular, the project aimed to see how the concept of the Human Microbiome can be critically challenged and to allow people to reach out to their microbes and explore the potential of their microbial self.

These questions were addressed using scientific tools and the results were translated into three-dimensional space installation in which people could literally meet their microbes.

[Sandra Volny]
What is sound art, and how do you create sound art to communicate concepts in science and climate change?

Sound art is a way to navigate spaces from the physical, the material to the tactile dimension and the imaginary. In my research, I experience aural spaces by listening to them: listening to the background noise and the echo that fill in the places, moving in an attempt to expose what is disappearing.

I create situations in which an individual’s awareness of his or her surroundings arises through sound. I don’t see my work as a tool to communicate concepts in science. Science inspires me and I am interested in conversing in a creative way with it: creating analogies between science and art, interpreting science and even challenging science with artistic hypothesis.

One of my current projects is about radio astronomy. Working closely with astrophysicists, I am interested in going back in time by listening to the distant creating an experience where the intangible radio waves coming from the universe become tangible.

The sound installation takes shape in a space where hearing becomes of a way of touching at a distance (upcoming in 2019). Listening consciously to our space forces us to renew our relationship with what surrounds us.

There is a beautiful chaos out there and we are surrounded by the multiple. We need to connect to the unseen, the invisible and the almost inaudible in order to weave a new tissue of relation with our environment.



Above: Sandra Volny, *Where does sound go, where does it come from* (video and sound installation gallery Dazibao, Montréal), 2016. Courtesy of the artist. Photo - Richard-Max Tremblay. © Sandra Volny. All rights reserved.

[Ruth Schmidt and Sandra Volny]

Please tell us about what inspired the creation of the Aural Soilscaapes project? What is the key message about climate change that it aims to communicate?

When we first met, we were interested in bridging both our fields of study: the scientific method and its precise measurements with the human experience that art can create. We wanted to move away from a pure scientific focus bringing empathy, resonance, movement to the reflection on climate change. We ask:

“How can we give a voice to the inaudible and invisible microbial life that is so crucial to our ecosystems?”

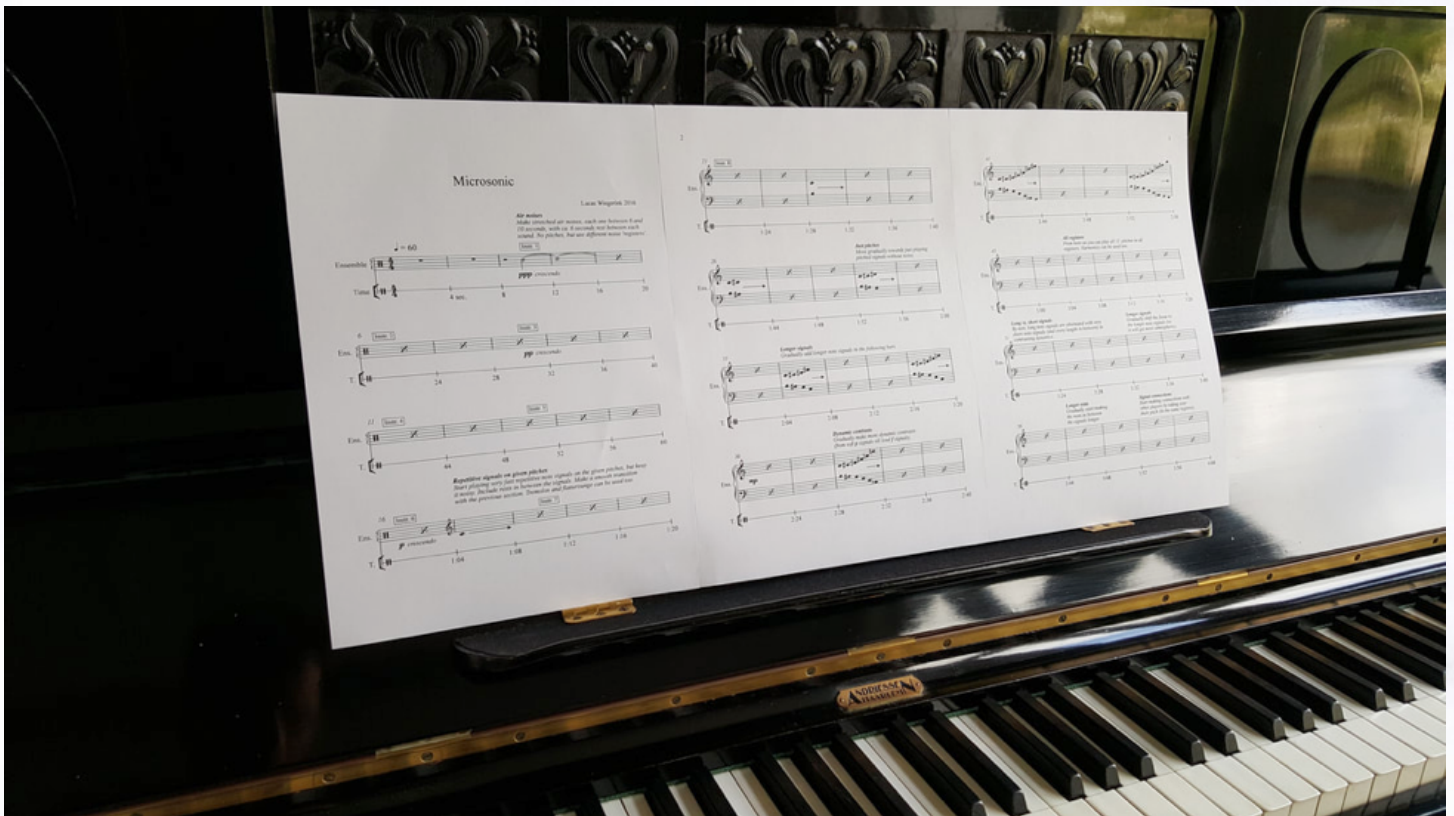
By combining scientific tools with artistic hypothesis, we aim to bridge science and fiction for an expanded awareness.

The living inhabitants of soil, plants and microbes, are capable of producing and perceiving sounds in order to interact with each other, yet at low frequencies and without an identified organ as animals and humans have. Environmental changes have huge impacts on soils, and climate change has been shown to alter interactions among organisms. Sound can be seen as an indicator of healthy ecosystems, which are likely impacted by climate change.

In this project, we want to answer the following question:

“How do sounds from our environment influence us as humans and how do we stand in relationship to other ecosystems and living organism?”

By doing so, we aspire to move away from the anthropocentric view of considering plants and other living organisms as objects, and move towards a holistic view of ecosystems interacting with each other and creating awareness to the interconnectedness of living organisms with the environment.



Above: Ruth Schmidt, Eva van Ooij, Lucas Wiegerink, Microsonic, a musical piece inspired by microbial communication, 2016. Courtesy to the composer. Photo: Lucas Wiegerink. © Ruth Schmidt. All rights reserved.

This project appears to bridge diverse subjects together. How does it combine science and art, as well as sound and climate change?

For the project Aural Soilscapes: creating ecological consciousness to climate change we established a transdisciplinary team of ecologists and a sound artist to create a new approach to create ecological consciousness by conducting sound field experiments and laboratory protocols.

Our team is composed of Dr. Ciara Raudsepp-Hearne, a senior scientist at the Sustainability Science Lab at McGill University and QCBS member, Dr. François-Joseph Lapointe, a tenured professor of biology at Université de Montréal and QCBS member,

Dr Nicolas Bélanger, a professor of environmental sciences at TELUQ, and Ariel Beaudoin-Lambert, a student currently doing a DESS in art, creation and technology at Université de Montréal. With the combination of our expertise, we aim to cross the artificial boundaries separating contemporary arts and sciences establishing a common framework to approach yet unknown terrain, such as our concept of aural soilscapes. We betake ourselves to theoretical and physical places to experience and document the becoming of ecological consciousness.

We specifically aim to merge disciplines to create something new. To us, artscience is not a way to communicate science, but means to create a space that allows to learn, experience and expand by inspiring each other with our different backgrounds.

Final thoughts

With Sandra Volny's sound and space research, and Ruth Schmidt's knowledge in microbial ecology, the team present art installations to increase environmental awareness. Both sharing a background in research, together, they listen into microbial sounds for their art, with the aim to increase our awareness of our connection to the environment, and the importance of climate change.

Bios

Sandra Volny is an artist/ researcher, founder of Sound and Space Research an international research platform based on research groups focusing on sound, space and its resonances with the social and environmental context. She received her Ph.D from La Sorbonne University in Paris (France) and has presented her work internationally in individual and collective exhibitions.

Ruth Lydia Schmidt is a microbial ecologist who is working on finding microbial solutions to combat climate change. She earned her PhD from Wageningen University in the Netherlands and is currently based in Montréal at the INRS-Institut Armand-Frappier Research Centre. She is passionate about bringing arts and science together and about building a more inclusive scientific community. She is a board member of the non-profit organization 500 Women Scientists and works as an instructor at the DIY community lab bricobio.

Links

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Connecting to nature through television

By Josh Gross (guest writer)

The mass media is now the dominant source of information about science and the environment (*Dahlstrom, 2014*). As humanity becomes increasingly urbanized, this is only going to become truer. While there is plenty to lament about the amounts of time people spend staring at screens, how might conservationists best turn the proliferation of media technologies to their advantage?



Above: The camera can be a dishonest tool. In this picture the author is surrounded by evidence of human activity: a concrete sidewalk, asphalt parking lot, building, and more; yet, by carefully angling the shot, he was able to exclude all of those elements. Previous authors have accused wildlife films of engaging in similar acts of 'nature-faking' (*Bousé, 2000*). Image © Josh Gross.

This is the question I began to explore in my recent master's thesis. Essentially, I took two different examples of wildlife television and compared them with one another: paying particular attention to specific messaging patterns, or frames, within them. I then started to theorize about what each series might do for environmental conservation. However, this was not the type of research I ever imagined I would undertake.

When I entered my master's program in 2016, I had lofty dreams of studying the human dimensions of jaguar conservation in steamy jungles. When the realities of educational funding in the United States set in, I decided that I did not have the time to conduct such intensive research. It was then that I turned to the medium that had made me interested in far-away locations in the first place: television.

Growing up in a suburban town near Cleveland, Ohio, I did not have access to vast wildernesses or charismatic megafauna. But I did have television. Programs like Kratts' Creatures and Zoboomafoo when I was younger – moving up to Survivorman,

River Monsters, the BBC documentaries, and Wild SafariLIVE later on – gave me glimpses of landscapes I would never visit and species I would never see in the wild. Since I already enjoyed these programs, it made sense that I should try to squeeze a master's thesis out of them.

The best way to study wildlife television's utility for conservation would be to experimentally test the impacts of wildlife TV programs on pro-conservation attitudes and behaviors. Unfortunately, I could not afford to stay in school long enough to conduct such an experiment, so I opted to investigate the content of two wildlife TV series.

I chose to examine Planet Earth II and Wild SafariLIVE. The BBC's Planet Earth II is a massively-popular 'blue chip' program, meaning it features spectacular visuals, 'voice of God' narration, an omission of political and historical references, closed narratives, and little-to-no evidence of human activity (Bousé, 2000; Scott, 2003). Wild SafariLIVE, produced by WildEarth TV and sponsored by National Geographic, is less well-known. It is a live, interactive



Above: The author, emaciated and semi-feral after weeks in the jungle, contemplates doing something fiendish atop Tikal's Temple IV. Image © Josh Gross.

safari that streams out of South Africa and Kenya. Trained safari guides drive or walk around the bush looking for animals, while responding to viewers' tweets in real time.

To understand what sorts of messages each program was sending to audiences, I borrowed Entman's (2007) widely-cited definition of media framing. When paraphrased, framing is the process of highlighting certain elements of reality at the expense of others, to encourage particular interpretations. This process occurs through the use of 'media frames,' which are messaging patterns that perform the functions of problem definition, causal analysis, moral judgement, and remedy promotion (Entman, 2007).

I identified the media frames in Planet Earth II and Wild SafariLIVE by separating the content from a selection of sample episodes into the functions listed above. I considered: dialogue, visuals, music, sound effects, and the presenters' actions and tones of voice. Once I had my framing results, I linked each programs' content to literature on universal human values and connectedness to nature. But I am only

going to discuss the latter paradigm here, because I find it to be more interesting.

Connectedness to nature is the degree to which an individual feels that they are part of the natural world. People with a higher connectedness to nature tend to be more environmentally conscious and to report higher overall well-beings than those who feel less connected to nature (Shanahan & Fuller, 2010; Arendt & Matthes, 2016; Bruni & Schultz, 2010; Hinds & Sparks, 2008). I gleaned the academic literature for factors that seemed to correlate with a higher connectedness to nature, and then applied those factors to both of my studied television programs.

While Planet Earth II has strong advantages, such as beautiful imagery, SafariLIVE might have more potential to connect audience members to nature. This is largely due to the guides, who model the exact types of behaviors that correlate with greater connectedness to nature. 'Nature' in SafariLIVE is not a world devoid of humans, but one which *Homo sapiens* can inhabit responsibly – if they choose to.



Above: Owing to its unedited format, Wild SafariLIVE tacitly challenges the idea of 'pristine' wilderness by including human artifacts in its shots. Roads, buildings, and fences make their way into the feed, although they are rarely the focus of a scene. This photo, in which a bridge is present but in the background, illustrates this point. Image © Josh Gross.

Granted, my study has notable limitations. The main one is that since this was a qualitative investigation, none of my claims are definitive. In addition, I omitted the “Cities” episode of Planet Earth II because its featured biomes were radically different than Wild SafariLIVE’s. Had I examined “Cities,” I might have been more enthusiastic about Planet Earth II’s potential influence on connectedness to nature.

Fortunately, these limitations mean that there are still plenty of options for future directions: one could test my assertions experimentally, examine the effects of SafariLIVE’s interactive format, and more.

While I lack the temperament to remain in academia, someone must continue to wrestle with how to design media that does the most good for conservation. There is a tremendous opportunity for social scientists and media producers to work together, if only we act to seize it.



Above: The author’s “lab” at the Slow Train Cafe in Oberlin, Ohio. Image © Josh Gross.

Bio

Josh Gross recently graduated with a master’s degree in Environment and Community from Humboldt State University, where he studied messaging patterns in wildlife television. He is currently trying to figure out how to not become destitute – and largely failing. Josh runs a top-rated wildlife blog at TheJaguarAndAllies.com

Links

Blog:
<https://thejaguarandallies.com/>

Thesis:
[Freely-Downloadable Thesis](#)

Scicomm illustrator showcase

Danielle Futselaar

How do you combine science with fantasy?

Daniëlle Futselaar knows everything about that!

She has made several artworks for prestigious Astronomical organisations and has written and illustrated a children's book about the universe which will be published this spring. She also illustrated children's books for Kluitman Publishing, Clavis Publishing and for the Institute of Competition Sciences.

Daniëlle Futselaar has been an independent Visual Artist since 2001 and since 2011 she has provided artwork for (among others) the SETI Institute (Search for Extraterrestrial Intelligence), NASA, SETI Berkeley - Breakthrough Listen, METI International and ASTRON. As a result, her work regularly appears in the media, including Nature, American Scientist, National Geographic, the Washington Post and the New York Times.

Below: Portrait of Danielle Futselaar. © Danielle Futselaar.

Links

Website:

<http://www.artsource.nl>

Blog:

<https://artsource-danielle.blogspot.com>

Facebook:

<https://www.facebook.com/daniellefuts/>

Twitter:

[@DanielleFuts](https://twitter.com/DanielleFuts)





Above: 'Kepler 138b'.
Artist Impression of exoplanet Kepler 138b, a Mars size planet in a tug of war.
Image Credit: SETI Institute/Danielle Futselaar. © Danielle Futselaar.



Above: Illustration created for SETI Berkeley - Breakthrough Listen
“Machine Learning Enables New Detections of FRB 121102”.

“Machine learning algorithms applied to Listen data from the Green Bank Telescope found new pulses from the mysterious repeating source FRB 121102. These new bursts were missed by conventional search methods, and are helping to answer questions about the origin of FRB 121102. Machine learning algorithms are also being applied to help Listen search for new kinds of candidate signals from extraterrestrial intelligence.”

Image Credit: Breakthrough Listen / Danielle Futselaar.
© Danielle Futselaar.
<http://seti.berkeley.edu/frb-machine/>



Above: Illustration created for METI International. "Artist's representation of a crumbling Dyson sphere orbiting KIC 8462852". "The hypothesis of an alien megastructure around KIC 8462852 is rapidly crumbling apart."

Image Credit: METI International / Danielle Futselaar. © Danielle Futselaar.

<http://meti.org/blog/no-extraterrestrial-laser-pulses-detected-kic-8462852-new-seti-organization-reports>



Left: 'Kepler 452b'.
Artist Impression of exoplanet
Kepler 452b, Earth's older
'cousin'.

Image Credit: SETI Institute /
Danielle Futselaar.
© Danielle Futselaar.

The background is a complex, abstract composition. It features a color gradient from a vibrant red on the left to a warm, golden-brown on the right. The surface is heavily textured with numerous small, dark brown and red speckles, resembling paint splatters or dust. Large, expressive brushstrokes in shades of dark brown and black are scattered across the lower half of the image, adding a sense of movement and depth. In the upper left corner, there is a distinct, fan-like pattern of fine, light-colored lines.

ART

Finding the finest Thangka artworks with Gammass Art Gallery

Thangka is an ancient type of Tibetan art, rich in tradition and philosophical meaning. In this special feature, we speak with the director of Gammass Art Gallery, who discusses the fascinating background behind Thangka art. Based in London, UK, the gallery seeks out the highest quality pieces of Thangka art from the locations it originated from in Asia. While technique and quality are key motivations, so are ethics, as Gammass Art Gallery puts deep thought into the welfare of the community in which each Thangka is crafted, before selecting it for their collection.



Left:
"Kalachakra
Mandala".
© Gammass Art
Gallery.
All rights
reserved.

Q & A - Iraklis Gatenadze (Gammass Art Gallery)

Please tell us about Gammass Art Gallery and how it began?

The idea of creating the Gammass Art Gallery, was inspired and subsequently born from our six-month journey across the Himalayas. The art gallery was founded in London, United Kingdom with the aim to make a socially positive impact by spreading the ethical ideas, which are embodied in the paintings. We had travelled across the original birthplace of Thangkas, which is Tibet, Nepal, North India and Bhutan, visiting temples and holy places to find the hidden gems - the best quality Thangkas to ever be painted.

Thangka is an ancient type of Tibetan Art, which has been practised and preserved in the Himalayan region for over two thousand years. This artwork was completely secluded from the outsiders, up until the mid-1990s and even nowadays can be rarely seen in the Western world.

Thangka painting involves the mastery of many demanding techniques. Depending on the size and quality of details it can take an artist up to three years to complete a single piece. Authentic Thangkas are painted on cotton, usually depicting a Buddhist deity, scene or mandala. Thangkas' measurements, linings, implementations, costumes and decorations are based on Indian style. Figure drawings are based on Nepalese style. The background sceneries are based on Chinese style. Hence, the art of Thangka is genuinely unique and distinctive.

What materials and techniques are used to create the Tibetan artwork featured in your gallery?

Preparation of the canvas is an essential part of the process, as it can greatly influence the painting. A mixture of animal skin glue, distemper and water is applied to the canvas, dried in the sun and polished with glass. This process is continuously repeated and can take up to two weeks.

Once the canvas is ready, the artist will then take precise measurements and start to sketch. The paint used to make a premium quality Thangka is derived

from precious & semi-precious natural minerals, crystals and plant materials, such as pearl, coral, lapis lazuli, cinnabar, sulphur, azurite, malachite etc. The artist grinds the material to a fine powder and mixes it with hide glue and water to create the paint. The final touch is made by applying 24 Carat Gold and Sterling Silver.

Finally, premium quality paintings are then taken to a Lama to bring the image 'alive' and infuse it with blessings & positive energy. Lama is a title officially extended only to the few dozen Tibetan Buddhist monks who have achieved the highest level of spiritual development. After this process has been completed, the Thangka will become an embodied receptacle of wisdom, ready to be hung as a genuine living embodiment of an enlightened mind.

How did the Thangka style of Tibetan Art originate, and what was its purpose in the past?

Originally, the paintings were created to help the viewer on his journey to enlightenment. Thangkas could be easily rolled up and taken on journeys by Tibetan monks who travelled extensively between rural areas and regional monasteries to provide religious teachings. The paintings were used as travelling altars or hung for special occasions when certain Buddhist deities or divine qualities were honoured and called upon.

The Chinese painting style had a vast influence on Tibetan art from the 14th century onwards. By the 18th century, Tibetan artwork incorporated many Chinese design and detail elements. However, the Thangka itself is traditionally considered as a Nepalese invention introduced to Tibet by Nepalese Princess Bhrikuti, who married the ruler of Tibet, Songtsen Gampo, around 621 CE.

Even nowadays, Buddhist practitioners believe that Thangkas are energetically charged and can bring positive changes to their owner. Thangkas are used as a spiritual medium to attract wealth and abundance all over Asia as well as being a protective tool against any unwanted situations and energies.

The Thangka style of Tibetan art appears to be rich in symbolism. Can you give some examples of the philosophical meanings behind the art?

Thangka is a Tibetan word, which means 'recorded message'. The painting can be explored similarly to a map through visual symbols and colours. Fully understanding the symbolic expression of the social, political and religious context would require years of learning and a degree in art history.

To summarise, Thangkas are generally depictions of important Buddhist motifs, such as the Wheel of Life, which is the visual representation of an Art of Enlightenment; the Life of Buddha, an illustration of the main events of the historical Buddha; Mandala, which symbolises psychic and cosmic order; and Buddhist deities, which represent different human and divine qualities. An interesting fact about mandalas is that the famed Swiss psychiatrist, Dr Carl Jung, used mandalas in his work with clients. He felt when concentrated upon, the mandala can bring up deeper human consciousness. This helped the client to receive revelation about the true potential and awareness of the self.

The blueprint drawings of the deities and mandalas are based on sacred measurements recorded in ancient scriptures. The painter must be properly trained and should have appropriate knowledge, background and religious understanding to create an accurate Thangka. Beyond question, a Thangka is meant to be the combination of fine art and spirituality, to create a captivating art piece filled with philosophical meaning.

Bio

Gammas is an Art Gallery based in London, United Kingdom, selling luxury Tibetan art called Thangka. Our paintings are made in an ancient, unique way using 24 Carat Gold and Precious Minerals.

The secret to premium quality paintings is passed by Buddhist Lamas from generation to generation and has been almost lost to humanity. Thangkas combine fine art with spirituality, to create a visual spectacle filled with philosophical meaning.

Are there any highlights you would like to share from your gallery?

Although, there is a very limited supply of Thangkas, we select only the ones we truly believe deserve to be in the best museum collections across the world. We make a very limited profit on the paintings firmly believing that our main purpose with the gallery is to find a perfect home for each Thangka and contributing to the wellbeing of the local communities in the Himalayas. Thangkas in our collection are selected based on the three main categories: the artist's experience, the philosophical meaning behind the art and the reputation of the place where the painting was made.

“..our main purpose with the gallery is to find a perfect home for each Thangka ..contributing to the wellbeing of the local communities in the Himalayas.”

Most of the art we sell use sacred geometry to create perfect geometrical shapes and aesthetic looks. Sacred geometry assigns symbolic and sacred meanings to certain geometric shapes and proportions.

For example, this Thangka is made by Tibetan Lama (please see 'Kalachakra' shown on p50). The painting depicts Kalachakra mandala. Mandala (literally a "circle") is a spiritual and ritual symbol in Buddhism and Hinduism, representing the Universe, and samsara (the cycle of birth, life and death).

Structurally, the Square (Stupa) is circled by rings of fire, earth, wind, water, wisdom and space. This mandala is a spiritual guidance tool, for establishing a sacred space at home, especially since it was made by a Lama, who according to the Buddhist tradition is the defender of Dharma (Cosmic Laws).

Links

Website:
www.gammas.com

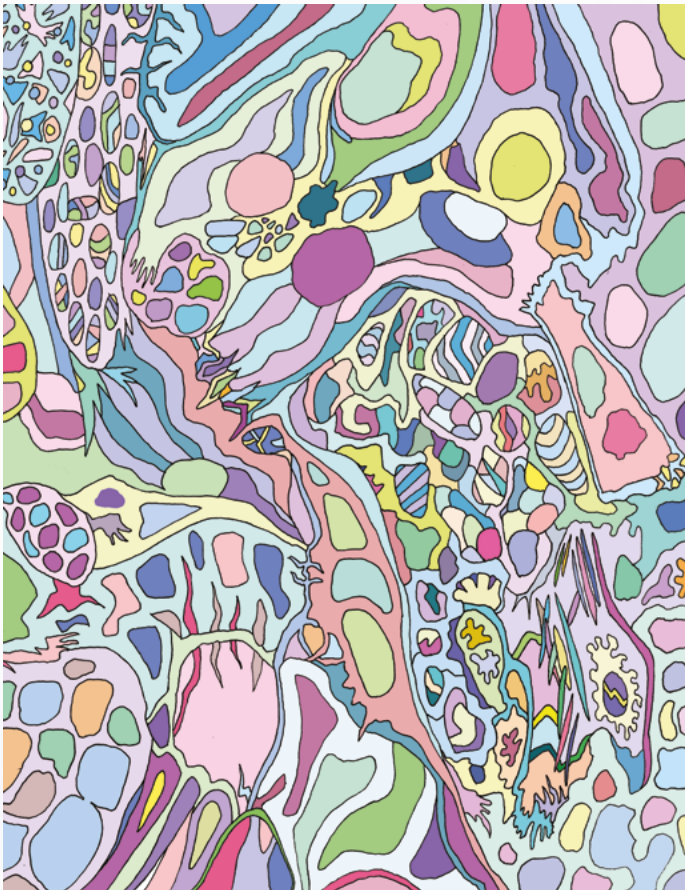
Instagram:
[@gammasart](https://www.instagram.com/gammasart)

Email:
info@gammas.com

Hannah Yoder

Bio

As a high school student in North Carolina's Research Triangle, I have had early opportunities to perform laboratory research and prepare microscope images (micrographs) of cells. My art is inspired by these micrographs and the astounding hidden world of intricate and diverse cellular structures they reveal.



Above: 'Journey' © Hannah Yoder - Amorphous shapes, inspired by neural stem cells, are interwoven with sharper edges and finer details, symbolic of differentiated or diseased cells. Like pluripotent stem cells, our lives can follow many possible paths; however, as in the process of cell differentiation, our ultimate fates are limited by our environment and our own irrevocable choices.

Links

Coloring book: [Coloring Book](#)

Website: <http://www.hannahsageyoder.com>

Artwork

These images are excerpted from my recent project: "Cellfies: A Cell Biology Coloring Book." This educational and artistic endeavor includes black-and-white coloring designs, as well as full-color images, with simple descriptions of the cell micrographs that inspired the art.



Above: 'Invasion' © Hannah Yoder - This drawing illuminates the surprising beauty of cancer (adenocarcinoma) cells. Their intricate arrays of thin, jagged lines connote the abnormal cytoskeletal behavior that drives their relentless invasiveness. The ominous allure of these line elements captures the eye, and reveals the irony of cancer - our own cells subtly and unwillingly turned against us.

Lisa Sara Jenkin

Bio

Lisa Sara Jenkin is a visual artist from London. Lisa studied for a BA in Illustration at Camberwell and achieved a Masters in Art Psychotherapy at Roehampton in 2015. Lisa's art is a celebration of Life, Nature and the Human Spirit. She draws creative inspiration from; Jungian Psychology, Western Alchemy, Winnicottian Theory, Abstract Expressionism, Archeology and Music.

Links

Website:

<https://www.lisasarajenkin.com>

Instagram:

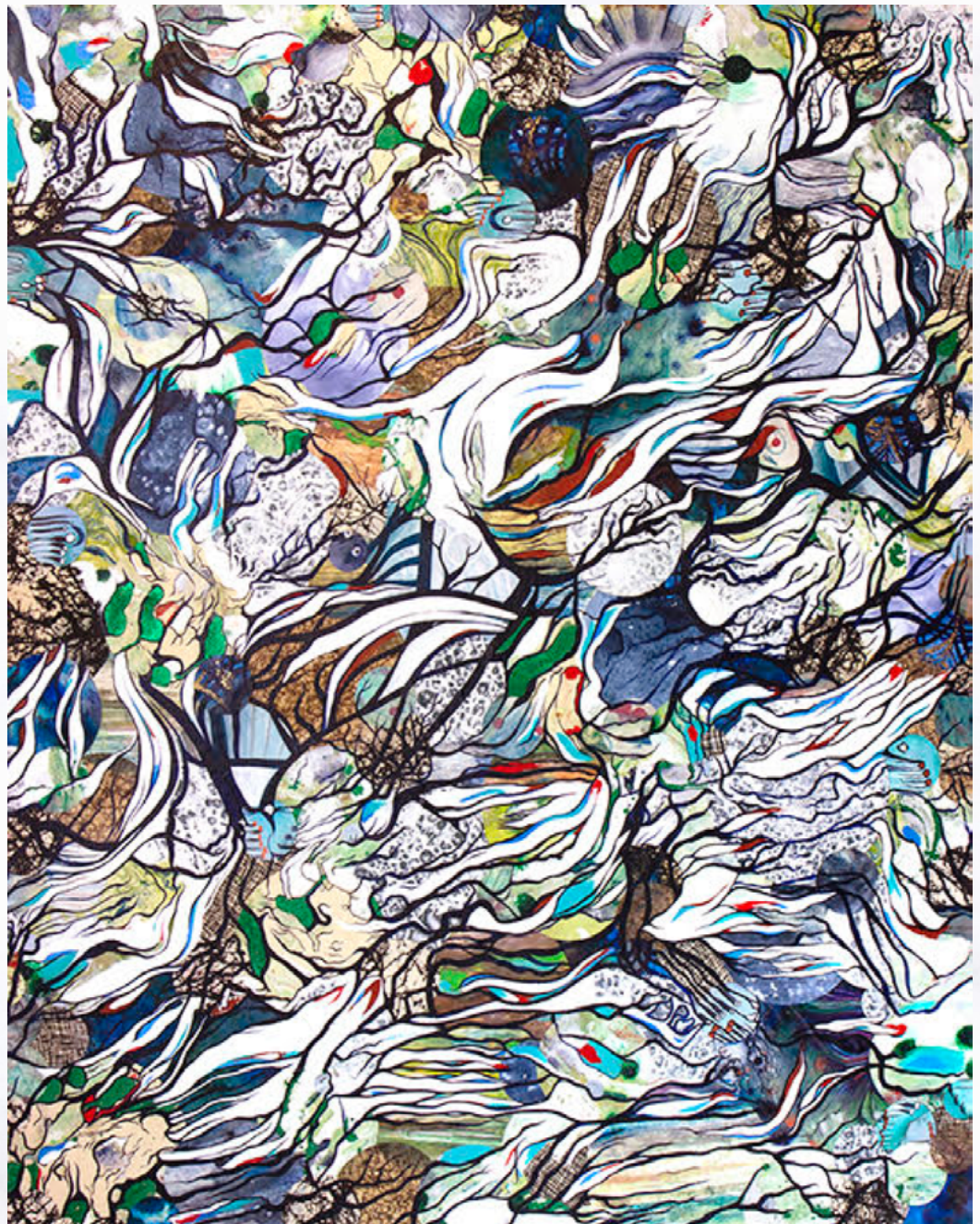
[lisasarajenkin](https://www.instagram.com/lisasarajenkin)

Artwork

Right: 'Nuvo Network'.
© Lisa Sara Jenkin.

This was the first image I made after having my daughter Alma. Unfortunately Alma had a stomach condition that prevented her from eating and sleeping properly. Making this piece helped me concentrate, self sooth and deal with sleep deprivation.

I collaged previous works on paper onto canvas, joining them together with broad white brushstrokes and organically growing black lines. It felt like I was healing my brain, reconnecting damaged pathways.



Right: 'RAW'
© Lisa Sara Jenkin -

*"...May what I do flow from me
like a river,
no forcing and no holding
back,
the way it is with children.*

*Then in these swelling and
ebbing currents,
these deepening tides moving
out, returning,
I will sing you as no one ever
has,*

*streaming through widening
channels
into the open sea."*

- Excerpt taken from p58,
Rilke's Book of Hours

Right: 'Serpentine Calligraphic'
© Lisa Sara Jenkin -

This smaller painting is from a
series of 6 images.
I painted it during an obsessive
period in which all my images
and sculptures seemed to
incorporate snakes, snake like
energy or movements.
I used acrylic paint, fluid
acrylics and markers on
canvas.



Art illustrator showcase

Jean-François Podevin

"The digital media has brought limitless new horizons to artistic expression. In my recent fine art print work, I use color relationship and patterns which would not exist otherwise. I still sketch draw and paint in the old fashioned way and this union of mediums has augmented my artistic expression beyond all expectations. I like to use the word 'visualist' to describe myself."



Links

Websites:

<http://www.jfpodevin.com>

<http://www.podevin.com>

Left: 'The Harmony of Chaos'
© Jean-François Podevin -

The spiraling hollowed shapes of this Conch shell evolves with continuity exactitude and perfection, while the shapes that came out of the hollows generate a fractal chaos of leaves.

Both elements hollowed in and hollowed out are a balancing act between harmony and chaos. I used my own photographs and a 3d software to create this image.



Above: 'Near Corbenic' © Jean-François Podevin - This unearthly combination of a giant Periwinkle seashell floating in the magical forest of Corbenic creates a realm where the fractal geometry, the mathematics found in Nature blend with the magical narrative tendency of our humanity. This ambivalence between nature's reality and our fantastic human imagination is what leads us towards new horizons in science. I used the digital medium because it transcends traditional techniques.

HEALTH



Connecting to nature through the Naturalshift programme

Whether we are hiking in the mountains or going for a walk in the park, walking in nature can help us to de-stress, benefiting our health as a result. In this special feature, we speak to Clare Moody, founder of Naturalshift, built upon the philosophy that our health can benefit when we connect to nature.

Through the Naturalshift programme, Clare Moody helps groups find inner balance and boost productivity. The programme includes references to sustainability, psychology and the work of John Muir - an influential naturalist and author, also known as the 'Father of Ecology', or 'John of the Mountains'.



Above: Naturalshift logo. © Naturalshift.
Click the above logo to go to the Naturalshift website.



Q & A - Clare Moody (Naturalshift)

Please tell us about your background and how you started Naturalshift?

I was brought up in the country and always had a passion for nature and animals. I liked them more than people. I remember being much more sad if an animal died than a person as a young girl. I studied Environmental Science as my first degree, helping me to understand the bigger picture of humanity on planet Earth and then Entomology as a Masters Degree.

I had yearnings to be a Victorian Butterfly Lady and had hoped to go to Indonesia with the British Museum, to collect wasps and study their taxonomy, when my mum died. I didn't go.

I then looked for a job in the UK. Environmental work was in its infancy then and I was offered a job with the newly formed environment group within PA Technology, near Cambridge. We did some of the first environmental projects with industrial companies in the UK. I then moved onto an American Management Consultancy, Arthur D. Little, also based in Cambridge.

We worked internationally, setting up many of the systems that are used today to, for example, certify companies to ISO 14001, the Environmental Management Standard and developing a system called OPRA, Operator Performance and Risk Assessment, still used by the Environment Agency today. Ecology work was sadly lacking.

I then went on to lecture and tutor at the University of Bath for over 10 years, while my children were growing up. I designed the (what was then) new, Sustainable Development module, taking the international participants on the Bath course to Schumacher college and out into nature, to reconnect them with the bigger picture. This module was then extended to the doctoral training centre as the first module they studied at the start of their 4 year Masters/PhD.

This course was ground breaking for its time, taking people into nature and helping them to reconnect. Now there are various companies who are starting to do this with organisations, Naturalshift being one of those.



Above: 'A sit spot in nature'. © Naturalshift

Below: The Naturalshift programme. © Naturalshift

The Natural Shift Programme



How has 'the Father of Ecology', John Muir, inspired Naturalshift's programme?

Naturalshift was born out of my experience working with Board level to shop floor in organisations, the Schumacher college sustainable development module and then a series of courses I studied from 2010 to 2015. John Muir, the father of Ecology, has always been a hero of mine, his passion and joy in nature and love of the natural world, involving art, dance and poetry, were inspiring to me and I studied the John Muir award and how to lead it. I felt at that time that I might just lead the John Muir Award but there did not seem to be much appetite for it in the SW of England, only in Scotland at that time. I then did my Walking Group Leader training course on Dartmoor, so that I could take groups out onto the Moor, and use John Muir techniques to reconnect them with nature.

Exercises inspired by John Muir are, for example, to imagine you are walking pushing the whole world around with your feet, spinning the globe, doing it mindfully and concentrating on the bigger picture, or lying down, your arms and legs outstretched, imagining you are held by the love of the earth, envisage the solar system stretching out in front of you, the planets and stars, imagine the thread of love that holds you right through the centre of the Earth and down to Australia. Imagine the continents, the oceans all

around you, visualise it all and meditate on it while you lie held by Earth's love.

John Muir also recommends, sitting in the trees, regaining your child like qualities, writing poetry, drawing pictures, running or rolling down the hills. He beautifully describes himself at the top of a tall North American fir tree, in the wind, like a bird on a reed.

A bursary to study Holism (Jan Christiaan Smuts was Prime Minister of the Union of South Africa A preeminent philosopher of his time, he pioneered the concept of holism, defined as "the tendency in nature to form wholes that are greater than the sum of the parts through creative evolution") and Leadership at Schumacher College followed, and my passion for helping leaders of organisations and their employees to be more 'whole', to see the bigger picture, to be more connected and more authentic, grew and grew.

At that time, 2015, Authentic Leadership had become a widely used term in management consultancy and the organisational change world, but I knew it wasn't just about the leader, it was about the whole organisation and individuals' leadership qualities at every level. Only one or two commentators were writing about that at the time. There seemed to be a focus on the leaders solely, those that research over many years had shown to be sociopathic in many



Left: Sign signifying John Muir's Wilderness - a wilderness area named after John Muir, that extends along the crest of the Sierra Nevada of California, in the Inyo and Sierra National Forests.

Image source:
[Olivia Wright](#), Pixabay.

instances. I did not think we were going to see the radical change needed at a global level by simply addressing the leaders.

Please tell us more about how the programme is influenced by nature..

We consider values and purpose of individuals and the organisation itself on a Naturalshift programme, but it is the deep immersion of the Time in Nature part of the programme, that is the fundamental element. This is where the 'shift' happens, the emotional connection to the earth and to one's inner wisdom. After considering values and purpose in the organisation, the Time in Nature and Coaching in Nature parts of the programme are key to the process of organisational and personal shift.

The Naturalshift programme is a combination of many different aspects of business and psychology, the neuroscience of forest bathing and connecting with nature, to authentic leadership, organisational change, values and culture of an organisation and why purpose is so key for individuals and for the health and happiness of those in an organisation.

Many cultures, especially shamanic cultures, point to the potential for our relationship with nature to foster something beyond relaxation. They view a connection with nature as an essential ingredient of spiritual growth as well. Ted Andrew's book, Signs in Nature is also a key influence for the 'Time in Nature' part of the Naturalshift programme.

Bio

Clare Moody is an entrepreneur, educator, visionary, coach. Passionate about Sustainability, 30 years experience working with businesses internationally to shift the way they operate through organisational change, systems, procedures, standards change, due diligence, Environmental impact assessment, strategy and policy work.

University lecturer and tutor for over 10 years in Sustainable Development and Environmental Management at the University of Bath, Course development in conjunction with Schumacher College, a centre for transformational learning and taking people into nature to get a greater connection with nature and with themselves.

Passionate about systems change, collaborative working, happiness and kindness in the workplace. Deep skills in Holism and Leadership, Deep Ecology, the Work that Reconnects. A coach who understands the bigger picture and coaches with soul.

Who can benefit from Naturalshift and how can it make a difference?

Anyone can benefit from a Naturalshift programme, but it is aimed at teams in organisations where the shift that occurs during the programme, can be embedded back into the organisation. Reconnecting with ones values and purpose and that of the organisation that you work for, is key to happiness and fulfilment in life, and therefore to productive , innovative, creative work. Significant shifts can occur in nature, in your understanding.

Answers coming from your inner wisdom, are allowed to surface and can be revolutionary and are connected to the earth as well as to yourself. We have lost much of our historical connection with the earth but spending conscious time in nature can help to rebuild that and remind us of our true purpose.

Emotional shifts and shifts in understanding, as well as answers to long held problems can occur during a Naturalshift programme, and the coaching approach helps to process these and embed them back in the organisation to achieve a real 'shift', connected to the earth and to realign business purpose to the Earth, from which all its resources are derived.

There are two mainstream psychology theories that underpin the Naturalshift programme, Psychoevolutionary Theory and Attention Restoration Theory. Look at www.naturalshift.global for more information.

Links

Website:
www.naturalshift.global

Email:
clare@naturalshift.global

Entre les soussignés :

Pierre Paul Frédéric Grossard agissant comme mandataire et au nom de Pierre Hipolyte Grossard père, propriétaire, demeurant à Bordeaux, allées d'Orléans N^o 36
Et monsieur Chenot fils, sellier carrossier, demeurant à Bordeaux cours du Jardin Public N^o 44.

Il est convenu ce qui suit :

Le sieur Grossard donne par ces présentes à titre de bail à loyer, pour trois années consécutives, qui prendront fin au premier Janvier mil huit cent soixante deux et qui ont commencé le premier Décembre mil huit cent soixante quatre, au dit sieur Chenot fils, ce acceptant, un logement possédé par le dit sieur Grossard à Bordeaux, cours du Jardin Public, numéros quarante quatre et quarante cinq, consistant en un magasin, d'un premier et d'une seconde étages, telle qu'elle est représentée par le plan ci-joint, avec toutes ses servitudes et dépendances.
Le sieur Chenot fils est autorisé à faire, à ses frais, tous les travaux de réparations qui pourront lui être nécessaires, sans que le sieur Grossard puisse réclamer au sieur Chenot fils aucune réparation pour papiers peints, peintures d'intérieur, blanchissage des murs ni des plafonds, ni pour faire entreprendre à ses frais toute réparation d'agrément qu'il sera possible de faire. Il est convenu comme clause expresse qu'à l'expiration de son bail, le sieur Chenot laissera la dite maison sans aucune dégradation, sans rien détruire, changer, ou modifier ce qui aura été fait pendant la durée de son bail, et sans pouvoir exiger aucun remboursement pour tout ou partie des dépenses qui auront été faites à la

Written
Word

The Math Hippocratic Oath

By Zim Olson

By this Math Oath,
I swear to at least try not to be an Oaf. Although I
know by nature of Math's Creative endeavor,
This may not be forever.
If by some measure,
I cause displeasure, I hope anyway,
that some one will find Mathematical Treasure.
and Lord forgive me of meaning,
that might be de meaning,
depending on some ones particular leaning.
That all Truth be True, and that all Applications
be the same, not Mathematically somehow vain,
and as God only knows Sane.
And if by factor number nine,
I do not tow this axiomatic line,
I pray the results are benign!

Bio

I have authored Zim Olson and Zim Mathematics for 30 plus years. I remember it all began with some doodling in my spare moment's years ago. I took note to myself that I seemed to do this rather well, and have continued this to my current math content as now made available at zimmathematics.com

Me and my wife live in Denver Colorado. We have lived in Denver area for more than thirty years.

Links

Website:

www.zimmathematics.com

PASTNESS

By Steven Duplij

Leaves – are covered
 With other ones.
 Lives – are melted
 Over them.
 Reflection – stop!
 I am alive.
 Leaves – are covered
 With other ones.

Tenderness – takes over
 Its parting.
 Sinfulness – overcomes
 Rejoicing.
 To be shot by moment –
 Conceal your lot.
 Tenderness – takes over
 Its parting.

Pastness – gives up
 Way today.
 Sickness –
 Of unfinished tables.
 World perverted in laugh –
 Hypocritical they.
 Pastness – gives up
 Way today.



Above: "Lecture by S. Duplij at the conference "Supergeometry and Applications", December 14-15, 2017, University of Luxembourg".
 © Andrew Bruce.

Bio

Steven Duplij (Stepan Douplii) is a theoretical physicist, poet and musician from Kharkov, Ukraine. Born in Chernyshevsk-Zabaykalsky, Russia. Doctor Phys.-Math. Sci. (Habilitation), editor of "Concise Encyclopedia of Supersymmetry" (Springer 2005), more than hundred scientific publications. Poems and mini-prose in different languages were published in national and international literary journals. Member of the Russian Union of Writers. Held creative meetings with lovers of poetry and art songs, during scientific trips to USA, England, Germany, China, Spain, Poland. Recorded CD albums and songs at studios in Germany and USA. Author of several books of poetry and miniprose.

Links

[Profile](#)

[Poetry book 2019 "Bosonization of feelings" \(in Russian\)](#)

[Song "Pastness" from album "Angel"](#)

[Poems \(autotranslated from Russian\)](#)

[Poems \(original in Russian\)](#)

Conscience of history

By Mohammad Ali Kheirollahi

Goes to deep mind
My dreams
Like a king
In the chess scene
When incidents attack me
Like black soldiers
And I am the checkmated king of this sphere
In splenetic battle of fate
For my failure
In retreat for a defeated king
For going to the unconsciousness of history



Author's note - "Based on a theory of psychology that considers two hidden and conscious human consciences and mind stashes in hidden conscience what is of no need and unattained desires and wishes."

Left: Portrait of Mohammad Ali Kheirollahi.
© Mohammad Ali Kheirollahi

Bio

I am Mohammad Ali Kheirollahi. I am 50 years old and I have a doctorate in jurisprudence and law from University of Tehran, Science and Research. I am a Professor and researcher of Law and Philosophy of Babol University (a city in north of Iran, near the Caspian Sea).

Links

Website:
<http://www.the-mirror-of-mind.simplesite.com>

Find me on the mountains

By Eve Sanchez (Oct 2018)

When the weekend comes at last,
When our working days have passed,
Will you go home to watch TV?
Or will you come out to hike with me?

I know we live in a modern world.
That our TV is colored and smart our
phones.
But we don't have to be robots!
Let's go back to nature, it is our home.

When the weekend comes
Whether cool or warm,
Leave your life at home
And find me on the mountains.

Bio

Eve Sanchez is a Cuban poet, artist, and blogger living in Arizona USA. Eve loves to feel like a part of nature and feels her best outdoors! She tries to hike every weekend and brings her family, including her three daughters, ages 1, 3, and 6 who also love to hike.

Below: Portrait of author while hiking. © Eve Sanchez.





NatureVolve

Bridging science & art

We hope you enjoyed this issue of NatureVolve, sharing ideas in science and art with the wider world, and bridging these areas together.

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